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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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|-----------------|-------------|----------------------|---------------------|

09/631,892 08/04/00 LICHTENHAN

J 38559-257945

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IM52/1024

PILLSBURY WINTHROP LLP
INTELLECTUAL PROPERTY GROUP
50 FREMONT STREET
SAN FRANCISCO CA 94120-7880

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| EXAMINER |
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| ROBERTSON, J | |
| ART UNIT | PAPER NUMBER |

1712

DATE MAILED:

10/24/01

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/631,892

Applicant(s)

LICHTENHAN ET AL.

Examiner

Jeffrey B. Robertson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-133 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-133 is/are rejected.
- 7) ☒ Claim(s) 8-21, 29 and 33-133 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the references to the prior art referred to on page lines 4 and 18 (to Marsmann et al. and Brown et al.) are objected to because they do not fully identify where this prior art may be found. Are these references journal articles or patents?
2. Applicant should not have "figures" in the specification because such a label indicates a drawing. For "Figure 1", pages 3-5 of the specification, applicant should remove any reference to a "figure". For Figures 2-9, applicants must submit the flow diagrams as drawings because even a change in the label of the figure will not result in conformance to Rule 37 CFR § 1.58 for those diagrams. The examiner has reproduced 37 CFR § 1.58(a) and MPEP § 608.01 for applicant's convenience.

37 CFR § 1.58 Chemical and mathematical formulae and tables.

(a) The specification, including the claims, may contain chemical and mathematical formulas, but shall not contain drawings or flow diagrams. The description portion of the specification may contain tables; claims may contain tables either if necessary to conform to 35 U.S.C. 112 or if otherwise found to be desirable.

MPEP § 608.01 (p. 600-59, August 2001)

Graphical illustrations, diagrammatic views, flowcharts, and diagrams in the descriptive portion of the specification do not come within the purview of 37 CFR 1.58(a), which permits tables, chemical and mathematical formulas in the specification in lieu of formal drawings. The examiner should object to such descriptive illustrations in the specification and request formal drawings in accordance with 37 CFR 1.81 when an application contains graphs in the specification. The specification, including any claims, may contain chemical formulas and mathematical equations, but may not contain drawings or flow diagrams.

Appropriate correction is required.

Double Patenting

3. Applicant is advised that should claim 121 be found allowable, claims 125, 127, 129, 131, and 133 will be objected to under 37 CFR 1.75 as being a substantial

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duplicate thereof. When two or more claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the others as being substantial duplicates of the allowed claim. See MPEP § 706.03(k).

Claims 121, 125, 127, 129, 131, and 133 are all product-by-process claims claiming the same compound. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Applicant is advised that should claim 120 be found allowable, claims 123, 124, 126, 128, 130, and 132 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two or more claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the others as being substantial duplicates of the allowed claim. See MPEP § 706.03(k). Claims 120, 122-124, 128, 130, and 132 all set forth the same general formulas. Since they are all product-by-process claims, they are directed to the same product. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its

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method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Claim Objections

4. Claims 8-21, 29, and 33-133 are objected to because of the following informalities: For claims 8, 33, 46, 59, 73, 86, 99, 120, 123, 124, 126, 128, and 130, in the formula for the heteroleptic nanostructure, the "p" is not subscripted. For claims 29, 40, 53, 67, 80, 93, and 108, organometallics is spelled incorrectly. For claim 33, what is the significance of "**(desired)**" in the 6th line of the claim? For claim 73, there is a period in the middle of the claim after "consisting of". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 8-133 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

→ Claims 8, 22, 33, 46, 59, and 73 are incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: for claim 8, it is not clear how the POSS nanostructure with R' and X groups is produced since the starting structure only contains $[\text{RSiO}_{1.5}]_{\infty}$, or

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R groups on the silicon atoms and no other reagent containing R' or X groups is set forth in the claim. For claim 22, it is not clear where the "X" substituent comes from because no reagent containing X groups is set forth in the claim. For claim 33, how are the heteroleptic nanostructures containing R' groups formed, where the starting material does not contain any R' groups? For claim 46, the difference between the POSS fragment and the POSS compound is not understood, because according to the claim, they may both have the same formula. For claim 59, both the first POSS nanostructure compound and the second POSS nanostructure maybe selected from the same formula, so the difference between the two is not clear. For claim 73, the formula of the POSS fragment is not identified. Also, what is the difference between the first POSS nanostructure and the second POSS nanostructure where both may have the same formula?

✓ For claims 8, 22, 33, 46, 59, 73, 86, 99, 120, 122, 123, 124, 126, 128, and 130, the term "of the composition" lacks antecedent basis because applicant has not set forth a composition in the claims.

→ For claims 8, 33, 46, 59, 73, 86, 99, 120, 123, 124, 126, 128, and 130, the term heteroleptic nanostructure compound is not understood, because R and R' are not required to be different, and therefore these compounds are not necessarily heteroleptic.

∠ For claim 9, the claim depends from claim 1, which has been cancelled. The examiner suggests changing the dependency from claim 1 to claim 8.

For claims 13, 27, 38, 51, 65, 78, 91, and 106, what is the definition of exhaustive? How much washing is exhaustive?

For claims 15, 20, 29, 32, 40, 45, 53, 58, 67, 72, 80, 85, 93, 98, 108, 113, are the definitions of R and X the same as given in claims 8, 22, 33, 46, 59, 73, 86, and 99?

For claims 57, 71, 84, 97, and 112, there is a lack of antecedent basis for the term "polymeric silsesquioxanes" because none of these claims or the independent claims from which they depend set forth the term polymeric silsesquioxane.

For claims 100 and 101, how are compounds not containing R, X, or R' groups rearranged into compounds containing those groups. For example, how are silicate nanostructure compounds rearranged into compounds containing R and R' groups?

For claim 115, the examiner does not understand the "108" in front of the first silicon atom in the formula. What does this mean?

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 120-133 are rejected under 35 U.S.C. 102(b) as being anticipated by Lichtenham et al. (U.S. Patent No. 5,484,867).

For claims 120-133, Lichtenham teaches in column 5, lines 35-65, a polyhedral oligomeric silsesquioxane of the formula $[(\text{RSiO}_{1.5})_4(\text{RXSiO}_{1.0})_3]_{\Sigma 7}$, where $\text{X}=\text{OA}$, $\text{A}=\text{H}$ and R is an organic group. It is noted that Claims 120-133 are product-by process claims. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-

process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Allowable Subject Matter

8. Claims 8-21, 29, and 33-133 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, and the claim objections set forth in this Office action.
9. Claims 22-28 and 30-32 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.
10. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest the methods set forth in claims 8-119. Specifically, none of the cited prior art teaches or suggests a process that mixes polymeric silsesquioxane, POSS nanostructure compounds, POSS fragments, functionalized POSS nanostructure compounds, or unfunctionalized POSS nanostructure compounds with base to provide silicate nanostructure compounds, functionalized and unfunctionalized heteroleptic nanostructure compounds, functionalized and unfunctionalized homoleptic nanostructure compounds, and POSS fragments.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tomoyori et al. (U.S. Patent No. 4,483,107) is being cited for teaching POSS compounds, but Tomoyori does not teach or suggest the methods of


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the present application. Shoji et al. (U.S. Patent No. 4,513,132), Shirahata et al. (U.S. Patent No. 4,946,921), and Katsoulis et al. (U.S. Patent No. 5,830,950) are being cited for teaching the reaction of silsesquioxanes under basic conditions silsesquioxanes that are soluble in basic conditions. However, none of these teaches the nanostructure compounds or fragments produced by the method set forth by applicant. Charrin et al. (U.S. Patent No. 6,245,926) is being cited for teaching the redistribution as a method for producing alkylmonohydrogenohalogenosilanes, but does not teach the POSS compounds of the present application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey B. Robertson whose telephone number is (703) 306-5929. The examiner can normally be reached on Mon-Fri 7:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert A. Dawson can be reached on (703) 308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JBR 
October 19, 2001



Robert Dawson
Supervisory Patent Examiner
Technology Center 1700